REMARKS

In the Office Action mailed on August 10, 2007 ("Office Action), the Examiner objected to claims 1, 13, 25-38 for minor informalities; rejected claims 1-9, 11, 13, 14, 16-19, 21-34, 36 and 38 under 35 U.S.C. § 103(a) as being unpatentable over IEEE Conference Proceeding ("Ad-hoc on-demand distance vector routing" by Perkins et al., published in Mobile Computing Systems and Applications, 1999 Proceedings, WMCSA '99 Second IEEE Workshop on 25-26 February 1999, Pages 90-100) (hereinafter "IEEE") in view of U.S. Patent No. 7,177,652 to Hopper et al. (hereinafter "Hopper"); and rejected claims 10, 12, 15, 20, 35, and 37 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over IEEE and Hopper, and further in view of Computer Networks: A Systems Approach Section 4.2.2 by Larry L. Peterson et al., 2nd edition, pages 284-288, published by Morgan Kaufmann Publishers, on October 1999 (hereinafter "Computer Networks").

Applicant amends claims 1, 13, 25-38 to correct minor formal matters. No new matter has been added. Claims 1-38 remain pending.

I. Objection to claims 13, 25-38

Applicant submits that the foregoing amendments address the objection to claims 13, and 25-38. Applicant respectfully requests the withdrawal of the objection.

II. Rejection of claims 1-9, 11, 13, 14, 16-19, 21-34, 36 and 38 under 35 U.S.C. § 103(a)

Applicant respectfully traverses the rejection of claims 1-9, 11, 13, 14, 16-19, 21-34, 36, and 38 under 35 U.S.C. § 103(a) as being unpatentable over IEEE in view of Hopper. A *prima facie* case of obviousness has not been established.

"The key to supporting any rejection under 35 U.S.C. § 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious." M.P.E.P. § 2142, 8th Ed., Rev. 6 (Sept. 2007). Such an analysis should be made explicit and cannot be premised upon mere conclusory statements. M.P.E.P. § 2142. "A conclusion of obviousness requires that the reference(s) relied upon be enabling in that it put the public in possession of the claimed invention." M.P.E.P. § 2145. Furthermore, "[t]he mere fact that references <u>can</u> be combined or modified does not render the resultant combination obvious unless the results would have been predictable to one of ordinary skill in the art" at the time the invention was made. M.P.E.P. § 2143.01(III), internal citation omitted, emphasis in original.

Moreover, "[i]n determining the differences between the prior art and the claims, the question under 35 U.S.C. § 103 is not whether the differences <u>themselves</u> would have been obvious, but whether the claimed invention <u>as a whole</u> would have been obvious." M.P.E.P. § 2141.02(I), internal citations omitted (emphasis in original). Accordingly, to establish a *prima facie case* of obviousness, an Examiner must, among other things, establish that the prior art teaches or suggests each and every element of a claim, and identify a reason why a person of ordinary skill in the art would modify a cited reference in a proposed manner. See M.P.E.P. § 2143; Office Memorandum dated May 3, 2007. "If the proposed modification or combination of the prior art would <u>change the principle of operation</u> of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious." M.P.E.P. § 2143.01 (VI) (emphasis added). Finally, the prior art can be modified or combined to

reject the claims as *prima facie* obvious only if there is a reasonable expectation of success. M.P.E.P. § 2143.02 (I).

Applicant submits that a *prima facie* case of obviousness has not been established for at least the reasons that (1) the applied references fail to disclose or suggest each and every element of claims 1-9, 11, 13, 14, 16-19, 21-34, 36 and 38 and (2) the Examiner's proposed combination would change the principle of operation of the prior art being modified.

Independent claim 1 recites a method of dynamically establishing an ad-hoc network including a plurality of machines comprising, among other things,

> determining a second set of the plurality of machines that are in direct communication range of one or more of the machines in the first set; [and]
>
> updating a computer-readable storage device of the machines included in at least one of the first and second sets of the plurality of machines based on at least one of (i) the respective machine changing locations within the environment and (ii) any of the machines included in the first or second sets changing locations within the environment.

IEEE and Hopper, taken alone or in combination, fail to disclose or suggest at least the determining and updating steps recited in claim 1.

IEEE states in section 2.3, first paragraph, "[w]hen either the destination or some intermediate node moves, a special route reply packet (RREP) is sent *to the affected source nodes*" (emphasis added). Specifically, IEEE teaches in section 2.1.2, paragraphs 1-2, that the affected source node is the node that sent a route request packet (RREQ) to the destination node, but no longer has a route to the destination node (or the intermediate node) due to the movement. The RREP travels back along the original path to the source node and takes the form of "< *source_addr, dest_addr,*

dest_sequence_#, hop_cnt, lifetime >." Thus, the only nodes that can be updated or otherwise affected by receiving the RREP are the source node and the intermediate nodes. Indeed, IEEE teaches in section 2.1.2, paragraph 3, that "[a] node receiving [further] RREPs . . . updates its routing information . . ." In contrast, claim 1 requires "updating a computer-readable storage device of the machines included *in at least one of the first and second sets of the plurality of machines*." IEEE does not disclose updating *sets* of nodes. The method of IEEE updates only those nodes *along the path traveled by the RREP*.

The Examiner admits that IEEE does not disclose or suggest updating based on a determination that "(i) the respective machine [changed] locations within the environment and (ii) any of the machines included in the first or second sets [changed] locations within the environment" and "determining a second set of the plurality of machines that are in direct communication range of one or more of the machines in the first set." The Examiner relies on Hopper as allegedly disclosing this subject matter. Office Action at 4.

Hopper, however, also fails to disclose or suggest at least "determining a second set of the plurality of machines that are in direct communication range of one or more of the machines in the first set," as recited in claim 1. Contrary to the Examiner's assertion at page 4 of the Office Action, Hopper repeatedly teaches against "determining a pro-active region and reactive region of the ad hoc network based upon the positional information of each user from GPS system" and "determining a pro-active region and reactive region of the ad hoc network based upon the number of hops to communicate between wireless devices." One example is found in col. 6, ll. 21-29:

> Accordingly, the positional information obtained from the GPS 212 is used by the controller 202 to arrive at a pro active region 120' that differs substantially from the pro active region 120 (FIG. 1) determined using the "two hop" method without the benefit of positional information. The pro active region 120' will ordinarily result in more efficient operation of the communication device of the user 106, which will produce higher quality communications for longer periods of time.

Hopper col. 6, ll. 21-29. Hopper thus discourages using the "two-hop" method to determine a "pro-active" region because it results in networks with lower communication quality.

Further still, the users in the "reactive" region of Hopper are determined *without regard* for their communication ranges to the users in the "pro-active" region. *Any user not in the "pro-active" region is considered to be in the "reactive" region*. Hopper, col. 1, ll. 47-52. Hopper thus does not provide that the "reactive" region has a particular communication relationship to the "pro-active" region. In contrast, claim 1 requires the "second set of the plurality of machines [to be] *in direct communication range* of one or more of the machines in the first set." Thus, Hopper does not rectify the deficiencies of IEEE.

Even if the Examiner's characterization of Hopper is correct, which Applicant does not concede, the proposed combination of IEEE and Hopper does not render claim 1 obvious because the combination would change the major principle of operation and objective of IEEE.

Hopper employs an exhaustive (i.e., brute force) detection of position information of each node in an area of a network from a respective node by sending the position information from each node to each respective node (i.e., global dissemination of connectivity information). Specifically, Hopper teaches that "[i]n block 306, each of

the users receives current position information from other users in the area"). Hopper, col. 4, ll. 41-42.

IEEE, however, repeatedly emphasizes that the communication method employed *minimizes* the amount of network traffic used in determining paths among nodes. IEEE utilizes an An-hoc On Demand Distance Vector Routing (AODV) method that avoids an exhaustive, brute force, search of nodes through the network using periodic, global advertisements. IEEE, abstract. For instance, section 1 of IEEE states:

> DSDV is effective for creating ad-hoc networks for small populations of mobile nodes, but it is a fairly brute force approach because it depends for its correct operation on the periodic advertisement and *global dissemination* of connectivity information. Frequent system-wide broadcasts limit the size of ad-hoc networks that can effectively use DSDV because the control message overhead grows as $O(n^2)$. DSDV also requires each mobile node to maintain a *complete list of routes, one for each destination within the ad-hoc network*...It is, however, possible to design a system whereby routes are created on-demand...With the goals of minimizing broadcasts and transmission latency when new routes are needed, we designed a protocol to *improve upon the performance characteristics of DSDV* in the creation and maintenance of ad-hoc networks.

IEEE, pp. 1-2, emphasis added.

Further, section 2.1 of IEEE describes a path discovery method in which each node determines *only* information about the destination and source of a packet and the next node *en route* to the destination. While the DSDV and the AODV algorithms both utilize distance vectors, they are distinct algorithms. The method of Hopper is another algorithm resembling DSDV, not AODV, because the method relies on periodic, global dissemination of positional information from each of the users. Hopper at col. 6, ll. 10-29. Thus, a combination of the methods of Hopper and AODV would be counter-productive to the goals of AODV, and would, in fact, resemble the DSDV algorithm upon

which AODV attempts to improve. For this reason, irrespective of whether the proposed combination of IEEE and Hopper is actually possible, which Applicant does not concede, the combination would require a change in the main principle of operation and overall objective of IEEE. One of ordinary skill in the art at the time of the invention would surely have been discouraged from combining IEEE and Hopper in the manner proposed by the Examiner.

For at least the reasons discussed above, IEEE and Hopper, taken alone or in combination, fail to disclose or suggest each and every element recited in claim 1. In addition, the proposed combination of IEEE and Hopper would require the abandonment of the major principle of operation and objective IEEE. Thus, the Examiner has not provided a "clear articulation of the reason(s) why the claimed invention would have been obvious," and a *prima facie* case of obviousness has not been established with respect to claim 1. Applicant respectfully requests the withdrawal of the rejection of claim 1 under 35 U.S.C. § 103(a) as being unpatentable over IEEE and Hopper.

Independent claims 13, 25, 26 and 38, although of a different scope than claim 1, recite features similar to those discussed above in connection with claim 1, and thus distinguish over the prior art for at least the same reasons as claim 1. The prior art also does not render obvious claims 13, 25, 26, and 38. Applicant respectfully requests the withdrawal of the rejection of claims 13, 25, 26, and 38 under 35 U.S.C. § 103(a) as being unpatentable over IEEE and Hopper.

Claims 2-9, 11, 12, 14, 16-19, 21-24, 27-34, 36, and 37 depend from one of claims 1, 13, and 26 and include all of the features thereof. Claims 2-9, 11, 12, 14, 16-

19, 21-24, 27-34, 36, and 37 thus distinguish from the prior art for at least the same reasons as claims 1, 13, and 26 as well as their additional features. The prior art thus also does not render obvious claims 2-9, 11, 12, 14, 16-19, 21-24, 27-34, 36, and 37. Applicant respectfully requests the withdrawal of the rejection of claims 2-9, 11, 12, 14, 16-19, 21-24, 27-34, 36, and 37 under 35 U.S.C. § 103(a) as being unpatentable over IEEE and Hopper.

III. Rejection of claims 10, 12, 15, 20, 35, and 37 under 35 U.S.C. § 103(a)

Applicant traverses the Examiner's rejection under U.S.C. 35 § 103(a) of claims 10, 12, 15, 20, 35, and 37. As discussed above, IEEE and Hopper fail to render obvious independent claims 1, 13, and 26. Computer Networks fails to remedy the deficiencies of IEEE and Hopper, nor does the Examiner rely on Computer Networks for such teachings. Office Action at 9.

Claims 10, 12, 15, 20, 35, and 37 depend from one of independent claims 1, 13, and 26 and include all of the features thereof. The prior art thus fails to render obvious dependent claims 10, 12, 15, 20, 35, and 37 for at least the same reasons as discussed above in connection with independent claims 1, 13, and 26. Applicant respectfully requests the withdrawal of the rejection of claims 10, 12, 15, 20, 35, and 37 under 35 U.S.C. § 103(a) as being unpatentable over IEEE, Hopper, and further in view of Computer Networks.

IV. Conclusion

In view of the foregoing, Applicant respectfully requests reconsideration of this application and the timely allowance of the pending claims.

The Office Action contains characterizations of the claims and the related art with which Applicant does not necessarily agree. Unless expressly noted otherwise, Applicant declines to subscribe to any statement or characterization in the Office Action.

If a telephone interview will expedite issuance of this Application, the Examiner is requested to call Applicant's undersigned representative at (202) 216-5118 to discuss any remaining issues.

Please grant any extensions of time required to enter this response and charge any additional required fees to our Deposit Account 06-0916.

Respectfully submitted,

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